Screening-level Review of Toxicity Information Contained in the Integrated Risk Information System (IRIS) Data Base

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Abstract

The Integrated Risk Information System (IRIS) is a publicly-accessible U.S. Environmental Protection Agency (EPA) data base containing information on the potential adverse health effects (noncancer and cancer) associated with chronic exposure to environmental chemicals. The information on IRIS is used throughout EPA and world wide to produce consistent risk assessments based on analysis of peer-reviewed data on toxicity and dose-response relationships. EPA has an ongoing program to add new chemicals to IRIS and to update the reviews of chemicals already on IRIS. However, the information on most of the IRIS chemicals was loaded onto the data base in the late 1980s and early 1990s. EPA was interested in the extent to which that information reflects the most current science and which entries should be considered for updating. A screening-level review of the available literature for chemicals in the IRIS data base was conducted to reach a preliminary determination of whether a toxicological reassessment based on the evaluation of new health effects literature would be likely to change existing IRIS toxicity values or cancer designations. This review consisted of a screen of the more recent literature contained in selected secondary literature sources (e.g., Agency for Toxic Substances and Disease Registry Toxicological Profiles) and in records retrieved from searches of on-line toxicological data bases (e.g., MEDLINE and TOXLINE). Consistent with the screening nature of this effort, review of the literature for relevance to IRIS reference value development and cancer designation was limited to study titles and abstracts. To date, screening-level reviews have been conducted for 460 chemicals in the IRIS data base. Results indicate that for 63% of the chemicals evaluated in this screening-level review, no new health effects studies were identified that would be likely to produce a change in existing IRIS toxicity values or cancer designations. Statements summarizing the findings of this screen have been added to the IRIS data base. These summary statements inform the IRIS user of the availability of newer scientific information that may be relevant to a health assessment for a given chemical. The findings of this review are considered in the priority-setting process for the annual selection of chemicals for IRIS reassessment.

Methods

1. Extract relevant toxicity and reference value information from authoritative secondary sources and existing IRIS Summaries

Secondary Sources
- ATSDR Toxicological Profiles
- Health Canada Assessments
- International Agency for Research on Cancer (IARC) Monographs
- World Health Organization (WHO)/International Programme on Chemical Safety (IPCS) Environmental Health Criteria
- National Toxicology Program (NTP) Cancer Bioassays
- NTP Report on Carcinogens
- Office of Pesticide Programs (OPP) Reregistration Eligibility Decision (RED) documents
- NCEA Provisional Assessments

2. Conduct literature searches to identify relevant health effects literature published since the existing IRIS summaries were completed

► Strategy:

Availability of secondary source	Years covered in literature search
No secondary sources were published after the IRIS toxicity values and/or WOE designation were completed	One year before the IRIS completion date to the present
A secondary source document was published after the IRIS toxicity values and/or WOE designation were completed	One year before the secondary source publication date to the present
A secondary source document was published after the IRIS toxicity values and/or WOE designation were completed. The secondary source contained a toxicity value based on study information made available after the IRIS completion date	A literature search was considered unnecessary to establish that potentially significant new health effects information exists

► Data bases searched: TOXLINE Special, MEDLINE, CCRIS, TSCATS, EPA OPP RED

3. Sort the more recent literature (based primarily on a review of titles and abstracts)

Study Categories
1. Potential to produce a significant change in an existing noncancer toxicity value
2. Potential to produce a significant change in an existing cancer toxicity value
3. Potential to produce a significant change in an existing cancer WOE designation
4. Physiologically-based pharmacokinetic (PBPK) modeling studies
5. Other toxicity studies not directly useful for establishing IRIS toxicity values
6. Studies with information on health effects in young populations
7. Secondary source (review) document
8. Not useful to IRIS toxicity value development
9. Unknown relevance (i.e., insufficient information contained in literature search record)

4. Determine if the new health effects information could change existing IRIS toxicity values or WOE designations

Results

- Screening-level reviews completed for 460 chemicals
- For 291 chemicals (63%), no new health effects information that would likely produce a significant change in existing toxicity values was identified
- For 169 chemicals (37%), new health effects information was identified that, if evaluated in detail, could possibly result in a change to an existing value

	RfD	RfC	CSF	IUR	WOE
Availability of Toxicity Values/WOE currently on IRIS:					
Available in the existing IRIS summary	324	107	70	45	193
Not available in the existing IRIS summary	136	353	390	415	267
Findings of Screening-Level Review:					
No literature likely to produce a significant change in the IRIS summary was identified	198	84	57	35	176
New literature was identified that could potentially produce a significant change in the IRIS summary	126	23	13	10	17
Toxicity value/WOE not available in the IRIS summary, but potentially relevant information was identified	37	42	36	12	154

RfD-Reference Dose
RfC-Reference Concentration
CSF-Cancer Slope Factor
IUR-Inhalation Unit Risk
WOE-Weight-of-Evidence designation

Limitations and Uncertainties of the Literature Screening-Level Review Process

- Not comprehensive
  - ► Only study summaries from secondary sources and titles and abstracts from literature searches were reviewed
- No in-depth assessment or critical evaluation of identified literature
- All relevant information, especially unpublished studies, may not have been captured
- Literature search records did not always present enough information to make a determination of relevancy to toxicity value development
- Application of new risk assessment methodologies to existing IRIS values was not considered
- A determination of whether the available toxicity information might support the derivation of a toxicity value not currently available in IRIS was beyond the scope of this review

Where to Find IRIS Literature Screening-Level Review Information

- IRIS Summaries (www.epa.gov/iris)

- IRIS Hotline
  202-566-1676
  202-566-1749 (Fax)
  Hotline.IRIS@epa.gov